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Synchrotron Light for Exploring Arsenic Environments in Arsenian Pyrite

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Substitution of arsenic in pyrite called arsenian pyrite is often accompanied by concentration of valuable metals such as gold in some deposits. In such mineralogical occurrence, a concentration-driven substitution of As encapsulating 'pure' pyrite is typical. Although knowledge of As substitution environment in pyrite is important in determining surface characteristics, and interactions in chemical processes such as oxidation, they are widely varied in nature with paucity of information in existing literature. The current study employed synchrotron X-ray spectroscopy (SXPS), using tunable excitation energy to study vacuum-fractured surfaces of arsenian pyrite. SXPS As 3d of arsenian pyrite suggest the existence of an As-As dimer in arsenian pyrite, characterised by a shift in bulk binding energy to 0.6 eV lower than the As-S dimer of arsenopyrite. Possible As cluster formation was also proposed. The high binding energy contribution at excitation energy of 100 and 210 eV were resolved into two surface components that may have formed from possible surface reconstruction or polymerisation.

Level of Expertise

Student

Presenter Gender

Man

Pronouns

He/Him

Which facility did you use for your research

Australian Synchrotron

Students Only - Are you interested in AINSE student funding

Yes

Do you wish to take part in the Student Poster Slam

Yes

Condition of submission

Yes

Primary author(s): FORSON, Philip (University of South Australia, Future Industries Institute-STEM)

Co-author(s): KRASOWSKA, Marta (University of South Australia); COWIE, Bruce (ANSTO); SKINNER, William (University of South Australia)

Presenter(s): FORSON, Philip (University of South Australia, Future Industries Institute-STEM)

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